Answer on Question #55136 – Math – Statistics and Probability

The chances that a visit to a primary health centre (PHC) results in neither lab work, nor referred to a specialist is 35%. Out of those coming to a PHC, 30% are referred to a specialist, and 40% require lab work. Find the probability that a visit to a PHC results in both lab work and referral to a specialist.

Solution

Consider the following events: *R* = "referral to a specialist", *L*= "lab work".

We shall use the two formulae:

$P[R \cup L] = P[R] + P[L] - P[R \cap L]$ (rule of addition)

$1 - P\left[\overline{(R \cup L)}\right] = P[R \cup L]$ (rule of subtraction)

We want to find

$$P[R \cap L] = P[R] + P[L] - P[R \cup L] = P[R] + P[L] - 1 + P\left[\overline{(R \cup L)}\right] =$$

$$= P[R] + P[L] - 1 + P[\bar{R} \cap \bar{L}] = 0.30 + 0.40 - 1 + 0.35 = 0.05\,.$$